TABLE OF CONTENTS

1–10 THE RELATION OF TANNINS TO THE DIFFERENTIATION OF THE ROOT TISSUES IN *REAUMURIA PALAESTINA*
Chen Ginzburg

11–16 SYNTHETIC HYBRIDS OF *ELYMUS CANADENSIS* × *SITANION HYSTRIX*
Douglas R. Dewey

16–21 APPARENTLY ABERRANT SEGREGATION OF NUTRITIONAL MARKERS IN *ASPERGILLUS NIDULANS*
W. B. Lanier

22–24 AREA MEASUREMENT OF MESQUITE (*PROSOPIS GLANDULOSA*) LEAVES BY USING LEAF-LENGTH MEASUREMENTS
C. W. Wendt, R. H. Haas, and J. R. Runkles

25–34 STUDIES ON THE PHYSIOLOGY OF REGENERATION BUDS OF *HORDEUM BULBOSUM*
M. Ofir, D. Koller, and M. Negbi

35–59 THE VASCULAR TISSUES AND DEVELOPMENT OF SCLERENCHYMA IN THE STEM OF THE MISTLETOE, *PHORADENDRON FLAVESCENS*
Clyde L. Calvin

60–68 DIURNAL VARIATIONS IN STEM DIAMETERS OF SMALL TREES
Theodore T. Kozlowski

69–73 INTERACTIVE EFFECTS OF SALINITY AND ATMOSPHERIC HUMIDITY ON THE GROWTH OF BEAN AND COTTON PLANTS
R. H. Nieman and L. L. Poulson

73–77 SUCROSE CONCENTRATION AND THE DIFFERENTIATION OF XYLEM IN CALLUS
John P. Rier and Davaline T. Beslow

79–82 ROOT GROWTH AROUND BARRIERS
Brayton F. Wilson

83–104 FLORAL DEVELOPMENT, ANATOMY, AND EMBRYOLOGY OF *COLLINSIA HETEROPHYLLA* WITH SOME NOTES ON TEN OTHER SPECIES OF *COLLINSIA* AND ON *TONELLA TENELLA*
Gould F. Schrock and Barbara F. Palser

105–109 RESPONSE OF CONIFERS TO GROWTH RETARDANTS
Richard P. Pharis, Manfred Ruddat, Cornell Phillips, and Erich Heftmann

109–112 SPECIATION IN *PYRUS:* CHROMOSOME NUMBER AND MEIOTIC BEHAVIOR
Quentin B. Zielinski and Maxine M. Thompson

113–116 INTERGENERIC HYBRIDS BETWEEN ALLOHEXAPLOID (*HORDEUM DEPRESSUM* × *H. COMPRESSUM*) AND AUTOTETRAPLOID SVALOF RYE (*SECALE CEREALE*)
A. B. Schooler

117–137 ANATOMY OF THE ENDOPHYTIC SYSTEM OF THE MISTLETOE, *PHORADENDRON FLAVESCENS*
Clyde L. Calvin

138–144 ASPECTS OF SIEVE ELEMENT ONTOGENY AND STRUCTURE IN *SMILAX ROTUNDIFOLIA*
Edward L. Ervin and Ray F. Evert

144–150 AN IMPROVED METHOD OF MAKING EPIDERMAL IMPRINTS
George E. Horanic and F. E. Gardner

150–152 A TECHNIQUE FOR CLEARING AND STAINING GYMNOSPERM LEAVES
W. Randall Shobe and Nels R. Lersten

153–159 FACTORS AFFECTING THE GROWTH OF RUST FUNGI ON HOST TISSUE CULTURES
Ramesh Maheshwari, A. C. Hildebrandt, and P. J. Allen

160–168 ASSIMILATION RATES OF SOME WOODLAND HERBS IN ONTARIO
J. H. Sparling

169–174 METHODS OF PROPAGATING BRYOPHYTE PLANTS, TISSUES, AND PROPAGULES
Michael J. Schneider, Paul D. Voth, and Robert F. Troxler

174–179 OCCURRENCE OF INDOLEACETIC ACID IN THE BRYOPHYTES
Michael J. Schneider, Robert F. Troxler, and Paul D. Voth

179–185 SEASONAL FLUCTUATION IN THE FOLIAGE-MOISTURE CONTENT OF WELL-WATERED CONIFERS
Richard P. Pharis

186–197 *HYPOXYLON FUSCUM*. II. DEVELOPMENTAL MORPHOLOGY ON *ALNUS TENUIFOLIA*
Jack D. Rogers

198–200 EFFECTS OF MALIC ACID SALTS ON GROWTH OF YOUNG COTTON EMBRYOS IN VITRO
J. R. Mauney, Jean Chappell, and B. J. Ward

200–205 COLD ACCLIMATION IN *CORNUS STOLONIFERA* UNDER NATURAL AND CONTROLLED PHOTOPERIOD AND TEMPERATURE
Robert B. van Huystee, C. J. Weiser, and P. H. Li

206–208 RESPIRATORY INHIBITION OF MATURE DETACHED BLUEBERRY FRUIT (*VACCINIUM ANGUSTIFOLIUM* AIT.) BY N^6-BENZYLADENINE, KINETIN, AND *N*-DIMETHYLAMINOSUCCINAMIC ACID
Amr A. Ismail and Walter J. Kender

208–211 SUPPRESSED BUDS ON LATERAL ROOTS OF *LIQUIDAMBAR STYRACIFLUA*
Claud L. Brown and Paul P. Kormanik

211–215 GERMINATION AND INITIAL GROWTH OF EASTERN COTTONWOOD AS INFLUENCED BY MOISTURE STRESS, TEMPERATURE, AND STORAGE
R. E. Farmer, Jr., and F. T. Bonner

215–218 AN UNUSUAL LAYER OF CELLS IN THE MESOPHYLL OF THE SOYBEAN LEAF
Donald B. Fisher

219–223 CALCIUM AND STRENGTH OF LEAVES. I. ANATOMY AND HISTOCHEMISTRY
H. P. Rasmussen

223–229 DEVELOPMENT OF THE OVULE AND MEGAGAMETOPHYTE IN *WISTERIA SINENSIS*
David H. Rembert, Jr.

GENERAL INDEX

A

Abies grandis, seasonal fluctuation in foliage-moisture content 179
Acer, *see* Red maple
Adaptation of assimilation rates of woodland herbs to light intensity 160
Allen, P. J., Factors affecting the growth of rust fungi on host tissue cultures 153
Alnus tenuifolia, host of Hypoxylon fuscum 186
Anatomy: floral vascular, of Collinsia and Tonella tenella 83; of endophytic system in mistletoe 117; of root tissues of Reaumuria palaestina 1; of tobacco leaves 219; sieve element ontogeny and structure in Smilax rotundifolia 138; unusual layer of cells in soybean leaf mesophyll 215
Antirrhinum majus, tissue cultures, as media for rust fungi 153
Aspergillus nidulans, aberrant segregation of nutritional markers 16
Assimilation rates of woodland herbs in Ontario 160
Atmospheric humidity, effects on growth of bean and cotton plants 69

B

Barley, bulbous, *see* Hordeum bulbosum
Bean, *see* Phaseolus vulgaris
N^6-Benzyladenine, respiratory inhibitor of blueberry fruit 206
Beslow, Davaline T., Sucrose concentration and the differentiation of xylem in callus 73
Blueberry, *see* Vaccinium angustifolium
Bonner, F. T., Germination and initial growth of eastern cottonwood as influenced by moisture stress, temperature, and storage 211
Brown, Claud L., Suppressed buds on lateral roots of Liquidambar styraciflua 208
Bryophytes: methods of propagating 169; occurrence of indoleacetic acid 174
Buds: regeneration, in Hordeum bulbosum 25; suppressed, on lateral roots of Liquidambar styraciflua 208

C

Calcium, in relation to leaf strength in tobacco 219
Callus: cultures, as media for rust fungi 153; differentiation of xylem affected by sucrose concentration of medium 73
Calvin, Clyde L., Anatomy of the endophytic system of the mistletoe, Phoradendron flavescens 117; The vascular tissues and development of sclerenchyma in the stem of the mistletoe, Phoradendron flavescens 35
Chappell, Jean, Effects of malic acid salts on growth of young cotton embryos in vitro 198
2-Chloroethyltrimethylammonium chloride, effect on conifer growth 105
Chromosome: associations in intergeneric hybrids between (Hordeum depressum × H. compressum) and Secale cereale 113; numbers in Pyrus 109; pairing in Elymus-Sitanion hybrids 11
Cold acclimation, factors affecting in Cornus stolonifera 200
Collinsia heterophylla, floral development, anatomy, and embryology 83
Conifers: response to growth retardants 105; seasonal fluctuation in foliage-moisture content 179
Cornus stolonifera, cold acclimation affected by photoperiod and temperature 200
Cotton, *see* Gossypium hirsutum
Cottonwood, *see* Populus deltoides
Cupressus arizonica, effect of growth retardants 105

D

Daylength, *see* photoperiod
Dendrograph, Fritts, used in measuring diurnal variations in stem diameters of small trees 60
Dewey, Douglas R., Synthetic hybrids of Elymus canadensis × Sitanion hystrix 11
2,4-Dichlorobenzyltributylphosphonium chloride, effect on conifer growth 105
N-Dimethylaminosuccinamic acid: effect on conifer growth 105; respiratory inhibitor of blueberry fruit 206
Diurnal variations in stem diameters of small trees 60
Dogwood, red-osier, *see* Cornus stolonifera
Dormancy, in buds on bulbs of Hordeum bulbosum 25

E

Electron microscope studies, *see* Ultrastructure
Elymus canadensis, synthetic hybrids with Sitanion hystrix 11
Embryo culture, effect of malic acid salts on cotton 198
Embryology, of Collinsia and Tonella tenella 83
Endophytic system, anatomy of mistletoe 117
Epidermal imprints made with Rhoplex AC-33 144
Ervin, Edward L., Aspects of sieve element ontogeny and structure in Smilax rotundifolia 138
Evert, Ray F., Aspects of sieve element ontogeny and structure in Smilax rotundifolia 138
Exotropy in red maple root growth 79

F

Farmer, R. E., Jr., Germination and initial growth of eastern cottonwood as influenced by moisture stress, temperature and storage 211
Fisher, Donald B., An unusual layer of cells in the mesophy of the soybean leaf 215
Floral development of Collinsia and Tonella tenella 83
Foliage-moisture content, seasonal fluctuation in well-watered conifers 179

G

Gardner, F. E., An improved method of making epidermal imprints 144
Germination in eastern cottonwood 211
Gibberellic acid, interaction with retardants of conifer growth 105
Ginzburg, Chen, The relation of tannins to the differentiation of the root tissues in Reaumuria palaestina 1
Glycine max, unusual mesophyll layer 215
Gossypium: effects of malic acid salts on growth of young embryos in vitro 198; salinity and atmospheric humidity affecting growth 69
Growth retardants, effect on conifers 105
Gymnosperm leaves, technique for clearing and staining 150
Gymnosporangium juniperi-virginianae, factors affecting growth on callus from host telial galls 153

H

Haas, R. H., Area measurement of mesquite (Prosopis glandulosa) leaves by using leaf-length measurements 22
Heftmann, Erich, Response of conifers to growth retardants 105
Helianthus annuus, tissue cultures, as media for rust fungi 153
Herbs, woodland, assimilation characteristics 160
Hildebrandt, A. C., Factors affecting the growth of rust fungi on host tissue cultures 153

Histochemistry of tobacco leaves 219
Horanic, George E., An improved method of making epidermal imprints 144
Hordeum: intergeneric hybrids with Secale cereale 113; H. bulbosum, physiology of regeneration buds 25
Humidity, effects on growth of bean and cotton plants 69
Hybrids: between allohexaploid (Hordeum depressum × H. compressum) and autotetraploid Svalof rye (Secale cereale) 113; synthetic, Elymus canadensis × Sitanion hystrix 11
4-Hydroxy-5-isopropyl-2-methylphenyltrimethylammonium chloride, 1-piperidine carboxylate, effect on conifer growth 105
Hypoxylon fuscum, developmental morphology on Alnus tenuifolia 186

I

Indoleacetic acid, occurrence in bryophytes 174
Ismail, Amr A., Respiratory inhibition of mature detached blueberry fruit (Vaccinium angustifolium Ait.) by N^6-benzyladenine, kinetin, and *N*-dimethylaminosuccinamic acid 206

J

Juniperus virginiana, callus from cedar-apple galls as medium for rust 153

K

Kender, Walter J., Respiratory inhibition of mature detached blueberry fruit (Vaccinium angustifolium Ait.) by N^6-benzyladenine, kinetin, and *N*-dimethylaminosuccinamic acid 206
Kinetin, respiratory inhibitor of blueberry fruit 206
Koller, D., Studies on the physiology of regeneration buds of Hordeum bulbosum 25
Kormanik, Paul P., Suppressed buds on lateral roots of Liquidambar styraciflua 208
Kozlowski, Theodore T., Diurnal variations in stem diameters of small trees 60

L

Lanier, W. B., Apparently aberrant segregation of nutritional markers in Aspergillus nidulans 16
Leaf: unusual layer of cells in soybean mesophyll 215; length, use of in area measurement of mesquite leaves 22; tobacco, anatomy and histochemistry 219; water content, seasonal fluctuation in conifers 179
Lersten, Nels R., A technique for clearing and staining gymnosperm leaves 150
Li, P. H., Cold acclimation in Cornus stolonifera under natural and controlled photoperiod and temperature 200
Libocedrus decurrens, seasonal fluctuation in foliage-moisture content 179
Light, adaptation in assimilation rates of woodland herbs 160
Liquidambar styraciflua, suppressed buds on lateral roots 208

M

Maheshwari, Ramesh, Factors affecting the growth of rust fungi on host tissue cultures 153
Malic acid salts, effects on growth of young cotton embryos in vitro 198
Marchantia polymorpha: methods of propagating 169; occurrence of indoleacetic acid 174
Mauney, J. R., Effects of malic acid salts on growth of young cotton embryos in vitro 198
Measurement, area, of mesquite leaves by using leaf-length measurements 22
Megagametophyte, development in Wisteria sinensis 223
Meiosis: in intergeneric hybrids between allohexaploid (Hordeum depressum × H. compressum) and autotetraploid Svalof rye (Secale cereale) 113; in Pyrus 109
Mesquite, *see* Prosopis glandulosa
Mistletoe, *see* Phoradendron flavescens
Moisture stress, influence on germination and initial growth of eastern cottonwood 211
Morphology, developmental, of Hypoxylon fuscum on Alnus tenuifolia 186

N

Negbi, M., Studies on the physiology of regeneration buds of Hordeum bulbosum 25
Nicotiana tabacum, relation of calcium to leaf strength 219
Nieman, R. H., Interactive effects of salinity and atmospheric humidity on the growth of bean and cotton plants 69
Nutritional markers, in Aspergillus nidulans 16

O

Ofir, M., Studies on the physiology of regeneration buds of Hordeum bulbosum 25
Ontario, assimilation rates in woodland herbs 160
Ontogeny, of sieve elements in Smilax rotundifolia 138
Ovule, development in Wisteria sinensis 223

P

Palser, Barbara F., Floral development, anatomy, and embryology of Collinsia heterophylla with some notes on ten other species of Collinsia and on Tonella tenella 83
Parthenocissus tricuspidata var. veitchi, callus, differentiation of xylem affected by sucrose concentration of medium 73
Pharis, Richard P., Response of conifers to growth retardants 105; Seasonal fluctuation in the foliage-moisture content of well-watered conifers 179
Phaseolus vulgaris, salinity and atmospheric humidity affecting growth 69
Phenology, correlated with assimilation rates of woodland herbs 160
Phillips, Cornell, Response of conifers to growth retardants 105
Phloem, in Smilax rotundifolia 138
Phoradendron flavescens: anatomy of endophytic system 117; vascular tissues and development of sclerenchyma in stem 35
Photoperiod, effect on cold acclimation in Cornus stolonifera 200
Photosynthesis, rates in woodland herbs in Ontario 160
Physiology, of regeneration buds of Hordeum bulbosum 25
Pinus lambertiana and P. ponderosa, seasonal fluctuation in foliage-moisture content 179
Populus deltoides, germination and early growth influenced by moisture stress, temperature, and storage 211
Poulsen, L. L., Interactive effects of salinity and atmospheric humidity on the growth of bean and cotton plants 69
Propagation of bryophyte plants, tissues, and propagules 169
Prosopis glandulosa, area measurement of leaves by using leaf-length measurements 22
Pseudotsuga menziesii, seasonal fluctuation in foliage-moisture content 179
Puccinia, factors affecting growth on host tissue cultures 153
Pyrus, chromosome number and meiotic behavior 109

R

Rasmussen, H. P., Calcium and strength of leaves. I. Anatomy and histochemistry 219
Reaumuria palaestina, relation of tannins to differentiation of root tissues 1
Red maple, root growth around barriers 79
Rembert, David H., Jr., Development of the ovule and megagametophyte in Wisteria sinensis 223

Respiration, inhibition in mature detached blueberry fruit by two cytokinins and a growth retardant 206
Rhoplex AC-33, for making epidermal imprints 144
Rier, John P., Sucrose concentration and the differentiation of xylem in callus 73
Rogers, Jack D., Hypoxylon fuscum. II. Developmental morphology on Alnus tenuifolia 186
Root: growth around barriers 79; occurrence of suppressed buds in Liquidambar styraciflua 208; tissues, relation of tannins to differentiation in Reaumuria palaestina 1
Ruddat, Manfred, Response of conifers to growth retardants 105
Runkles, J. R., Area measurement of mesquite (Prosopis glandulosa) leaves by using leaf-length measurements 22
Rust fungi, *see* Puccinia
Rye, Canada wild, *see* Elymus canadensis

S

Salinity, effects on growth of bean and cotton plants 69
Schneider, Michael J., Methods of propagating bryophyte plants, tissues, and propagules 169; Occurrence of indoleacetic acid in the bryophytes 174
Schooler, A. B., Intergeneric hybrids between allohexaploid (Hordeum depressum × H. compressum) and autotetraploid Svalof rye (Secale cereale) 113
Schrock, Gould F., Floral development, anatomy, and embryology of Collinsia heterophylla with some notes on ten other species of Collinsia and on Tonella tenella 83
Sclerenchyma, in stem of mistletoe 35
Secale cereale, intergeneric hybrids with Hordeum 113
Seed set, in Elymus-Sitanion hybrids 11
Sequoia sempervirens, effect of growth retardants 105
Shobe, W. Randall, A technique for clearing and staining gymnosperm leaves 150
Sieve elements, in Smilax rotundifolia 138
Sitanion hystrix, synthetic hybrids with Elymus canadensis 11
Smilax rotundifolia, ontogeny and structure of sieve elements 138
Snapdragon, *see* Antirrhinum majus
Soybean, *see* Glycine max
Sparling, J. H., Assimilation rates of some woodland herbs in Ontario 160
Squirreltail, *see* Sitanion hystrix
Stem diameters of small trees, diurnal variation 60
Sterility, of Elymus-Sitanion hybrids 11
Storage, influence on germination and initial growth of eastern cottonwood 211
Sucrose concentration of medium affecting xylem differentiation in callus 73
Sunflower, *see* Helianthus annuus
Sweetgum, *see* Liquidambar styraciflua

T

Tannins, relation to differentiation of root tissues 1
Temperature: effect on cold acclimation in Cornus stolonifera 200; influence on germination and initial growth of eastern cottonwood 211; relation to dormancy of regeneration buds of Hordeum bulbosum 25
Thompson, Maxine M., Speciation in Pyrus: chromosome number and meiotic behavior 109
Tissue cultures, host, as media for rust fungi 153
Tobacco, *see* Nicotiana
Tonella tenella, floral vascular development 83
Transfusion tissue, clearing and staining in gymnosperm leaves 150
Troxler, Robert F., Methods of propagating bryophyte plants, tissues, and propagules 169; Occurrence of indoleacetic acid in the bryophytes 174

U

Ultrastructure, of root tissues of Reaumuria palaestina 1

V

Vaccinium angustifolium, respiratoty inhibition of fruit by chemical treatment 206
Van Huystee, Robert B., Cold acclimation in Cornus stolonifera under natural and controlled photoperiod and temperature 200
Vascular anatomy: of endophytic system in mistletoe 117; in stem of mistletoe 35
Voth, Paul D., Methods of propagating bryophyte plants, tissues, and propagules 169; Occurrence of indoleacetic acid in the bryophytes 174

W

Ward, B. J., Effects of malic acid salts on growth of young cotton embryos in vitro 198
Water balance and diurnal variations in stem diameters of small trees 60
Weiser, C. J., Cold acclimation in Cornus stolonifera under natural and controlled photoperiod and temperature 200
Wendt, C. W., Area measurement of mesquite (Prosopis glandulosa) leaves by using leaf-length measurements 22
Wilson, Brayton F., Root growth around barriers 79
Wisteria sinensis, development of ovule and megagametophyte 223

X

Xylem, differentiation in callus affected by sucrose concentration of medium 73

Z

Zielinski, Quentin B., Speciation in Pyrus: chromosome number and meiotic behavior 109